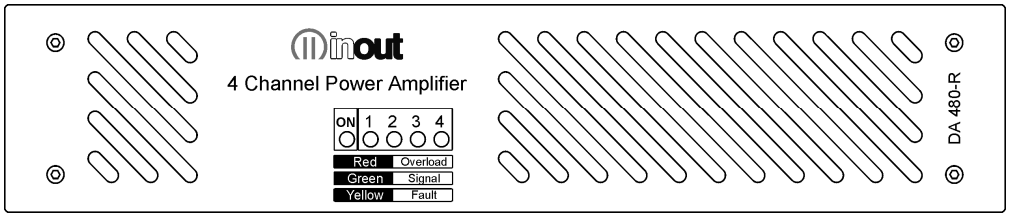
USER MANUAL



DA 480-R

Version 1.3

inout

Warranty

DA 480-R is covered by 24 month warranty on its electronics parts, starting from the date of purchase. This warranty becomes void in case of tampering with the device and in case of work carried out on it by people that were not authorized by the manufacturer or by an authorized dealer. Warranty conditions are those described in the “Warranty Rules”.

NOTE - responsibility of the purchaser: in case of repair under warranty, the device must be packed in order to avoid damage during transport and shipped to the manufacturer together with all the accessories.

Warranty Rules.

1. In order to exercise his warranty rights, the purchaser must include with the device a copy of the evidence of purchase duly stamped by the dealer (bill/invoice).

2. The warranty lasts 24 months on the electronic parts. The warranty is granted at the point of sale or it could be directly requested to the manufacturer.

3. The warranty only covers damage to the product which makes it work badly.

4. Work under warranty will only mean repairing or replacing, free of charge, any parts acknowledged being defective during manufacture or in their material, including labour costs.

5. The warranty does not apply to damage caused by negligence or failure to comply with the instructions, or damage caused by unauthorised people, with a special reference to the external parts.

6. Also, the warranty does not apply to damage caused to the device by connection to unsuitable power sources.

7. The warranty does not cover parts that are subject to wear as a consequence of the use, as well as the chassis if the material is not defective.

8. The warranty does not include transport costs, which will be paid by the purchaser depending on way and time of transport.

9. The warranty expires 24 months after the purchase. In this case, service will be provided charging for the replaced parts, labour costs and transport according to the current rates.

10. In case of any controversy the Court of Law of Venice has the exclusive jurisdiction.

SUMMARY

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1.2 Contents of the DA 480-R
1.3 Safety rules

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3.2 2 ch amplification - BRIDGED
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5.2 Thermal protection
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6. Constant voltage outputs (100V)

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7.2 Mechanical dimensions
7.3 Block diagram

1 Installation

1.1 Introduction

The power amplifier DA480-R has been developed to satisfy most of the professional audio installations and designed to provide performance with the best stability and reliability, permitting a continued use without failure and without the need of maintenance.
The power stages circuitation is based on the new generation “Class D” technology that permit to obtain high quality performance, low heat dissipation and that permit to keep distortion within a very small range also with a high power supplied.
Power supply circuit is “switch mode” with the benefit of high efficiency and reduced weight.

1.2 Contents of the DA 480-R

Contents of the DA480-R kit:

- n° 1 DA 480-R device
- n° 1 user manual
- n° 1 power supply cable

1.3 Safety rules

Read carefully the following warnings to keep your and others safety, for the right use of the device and to avoid warranty invalidation.

1. Do not expose the device to rain or high humidity. Protect the device from accidental liquid penetration, if it happens, stop using the device and apply to qualified or authorized personnel.
2. Do not insert things into the device through the openings to avoid risk of fire or electric shock.
3. Before connect the amplifier, ALWAIS verify the ground connection as requested by the law.
4. Disconnect the device from the light socket before make any operation for the internal device configuration.
5. This power amplifier has been designed and produced to operate ONLY with a 230VAC mains power.
6. If the original power cord is waste or deteriorate, replace it with a similar one.
7. For speakers connections the use of cables with appropriate section and that meet the safety laws is suggested
8. Switch on the amplifier only after all the other components of the sound system have been connected and switched on, to avoid hums and annoying noise from the speakers.
9. Disconnect the device from the light socket before make cleaning operations. Clean the device with a dry and soft cloth. Do not use liquids or spray that can contain flammable elements.

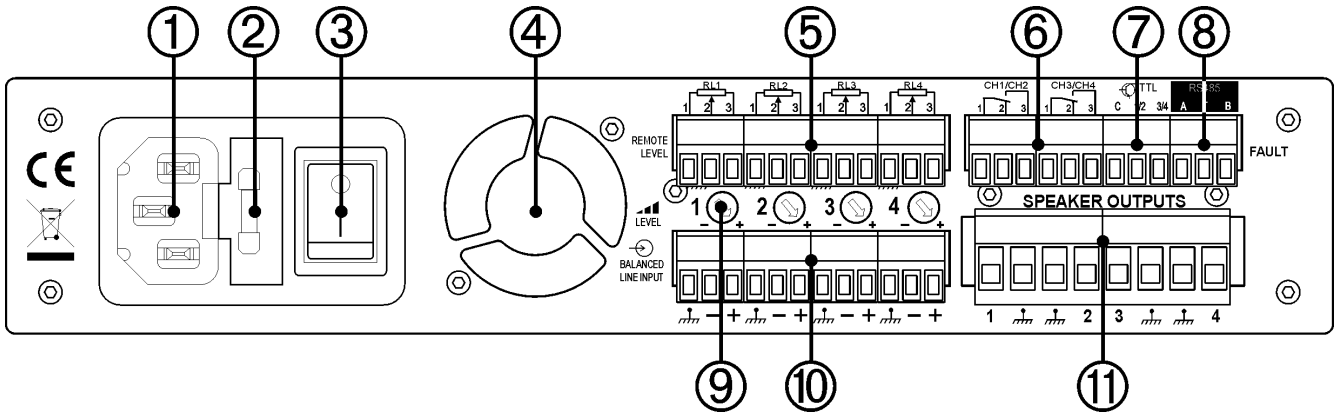
10. Device handling must take place only when all the cables have been disconnected.
11. Device maintenance must be done only by qualified personnel.
12. For any requirement or technical information contact InOut or authorized personnel.

OBSOLETE DEVICES DISPOSAL

- This picture means that the device is European Directive 2002/96/EC compliant.
- All electronic and electric devices should be disposed separately from the normal garbage, by specific gathering plants designated by the government or by local authorities.
- Correct disposal of obsolete devices, of the accessories and especially of the batteries, contribute to prevent possible negative consequences on human health and on the environment.
- For detailed information on obsolete devices disposal, contact the municipality, the garbage disposal service or the store where you bought the device.

2 Overview

2.1 Rear panel overview



1) 230VAC mains power connector, use the appropriate supplied cable.

2) Protection fuse on mains power

3) Mains power switch

4) Forced ventilation fan

IMPORTANT:
The power amplifier, during regular operation, needs a suitable cooling that can be done by natural or forced ventilation.
Device installation must allow holes that permit a regular air flow. Air scoops are on the front panel, air exit is from the rear panel.
In case of more amplifiers mounted on a single rack, air exchange could be poor; it's advisable, in this case, to provide forced ventilation to the rack too. It's advisable that the ventilation take place with the air aspiration from the bottom and the air emission from the top of the rack.

5) External volume adjustment potentiometers connector (VCA)

6) Fault output relay connector

7) Fault output TTL connector

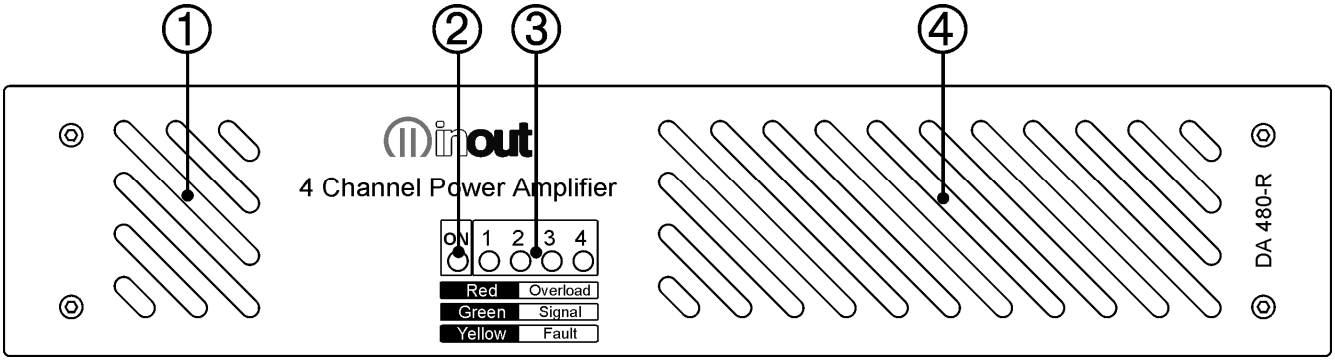
8) RS485 serial connector

9) CH 1-2-3-4 input sensibility adjustment potentiometers

10) CH 1-2-3-4 balanced input connectors

11) CH 1-2-3-4 power output (speakers) connector.

2.2 Front panel description



1) Power amps cooling grille.

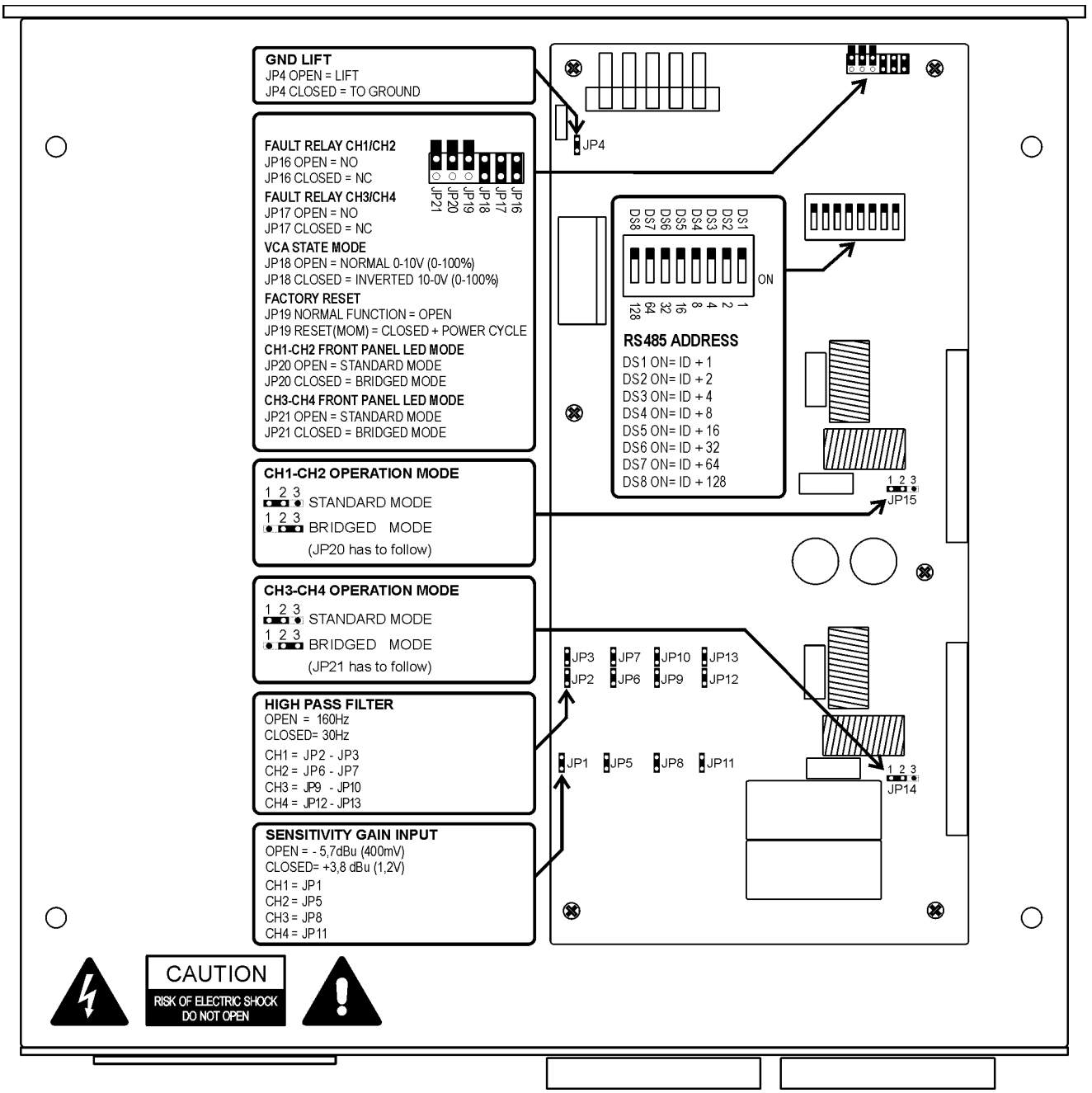
2) “Device ON” LED, powered device.

3) Three-colour LED with indication purpose:

LED		*Description*	*Indicating*
off	=	input signal not present or too low	
green	=	input signal present	SIGNAL
red	=	input signal too high	OVERLOAD
yellow	=	output channel fault	FAULT

4) Power section cooling grille.

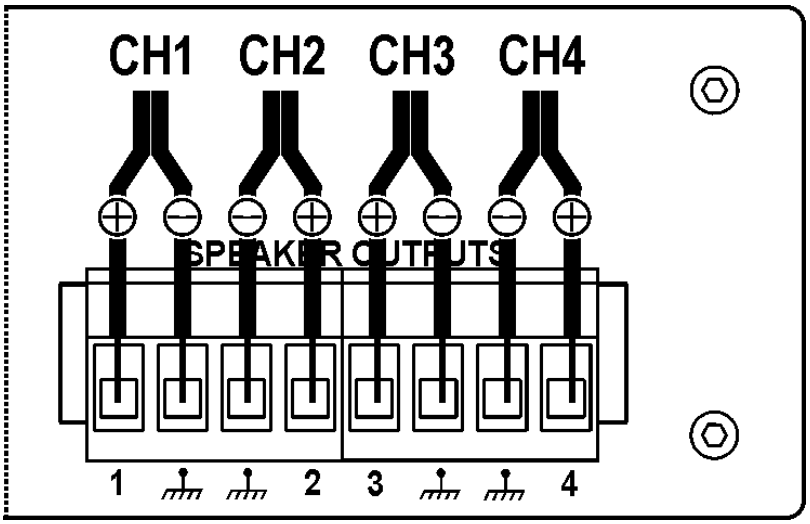
2.3 Power amp configurations general overview


GND LIFT
JP4 OPEN = LIFT
JP4 CLOSED = TO GROUND
FAULT RELAY CH1/CH2
JP16 OPEN = NO
JP16 CLOSED = NC
FAULT RELAY CH3/CH4
JP17 OPEN = NO
JP17 CLOSED = NC
VCA STATE MODE
JP18 OPEN = NORMAL 0-10V (0-100%)
JP18 CLOSED = INVERTED 10-0V (0-100%)
FACTORY RESET
JP19 NORMAL FUNCTION = OPEN
JP19 RESET(MOM) = CLOSED + POWER CYCLE
CH1-CH2 FRONT PANEL LED MODE
JP20 OPEN = STANDARD MODE
JP20 CLOSED = BRIDGED MODE
CH3-CH4 FRONT PANEL LED MODE
JP21 OPEN = STANDARD MODE
JP21 CLOSED = BRIDGED MODE
JP21 JP20 JP19 JP18 JP17 JP16
CH1-CH2 OPERATION MODE
1 2 3 STANDARD MODE
1 2 3 BRIDGED MODE
(JP20 has to follow)
CH3-CH4 OPERATION MODE
1 2 3 STANDARD MODE
1 2 3 BRIDGED MODE
(JP21 has to follow)
HIGH PASS FILTER
OPEN = 160Hz
CLOSED= 30Hz
CH1 = JP2 - JP3
CH2 = JP6 - JP7
CH3 = JP9 - JP10
CH4 = JP12 - JP13
SENSITIVITY GAIN INPUT
OPEN = - 5,7dBu (400mV)
CLOSED= +3,8 dBu (1,2V)
CH1 = JP1
CH2 = JP5
CH3 = JP8
CH4 = JP11
JP4
DS8 DS7 DS6 DS5 DS4 DS3 DS2 DS1
ON
128 64 32 16 8 4 2 1
RS485 ADDRESS
DS1 ON= ID + 1
DS2 ON= ID + 2
DS3 ON= ID + 4
DS4 ON= ID + 8
DS5 ON= ID + 16
DS6 ON= ID + 32
DS7 ON= ID + 64
DS8 ON= ID + 128
1 2 3
JP15
JP3 JP7 JP10 JP13
JP2 JP6 JP9 JP12
JP1 JP5 JP8 JP11
1 2 3
JP14
CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

3 Connections

3.1 4 channels configuration

4 CHANNELS AMPLIFICATION OUTPUT CONNECTIONS

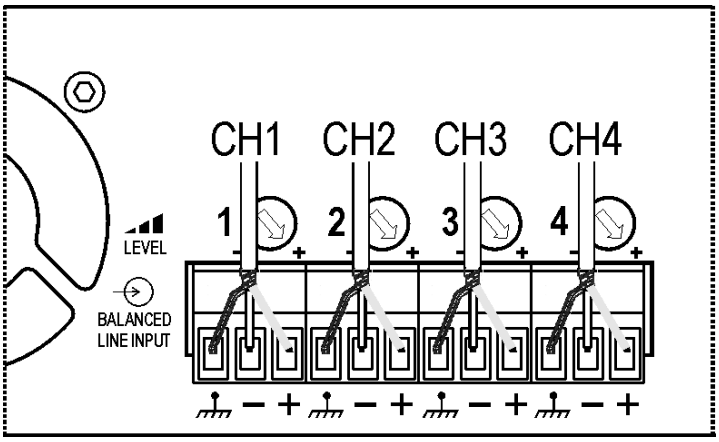


Observe correct polarity in speaker connection to have output signals in phase with the input ones.

IMPORTANT:

- Do not connect outputs among them or to others amplifiers outputs.
- Do not short circuit the outputs.
- To connect the speakers use the appropriate cable section depending on the connection length. Reduced section cables cause power loss along the line with, consequently, cable heating.

4 CHANNELS AMPLIFICATION INPUT CONNECTIONS



BALANCED INPUT:
Pin 1: ground
Pin 2: reverse phase signal
Pin 3: in phase signal

UNBALANCED INPUT:
Pin 1: ground
Pin 2: ground
Pin 3: in phase signal

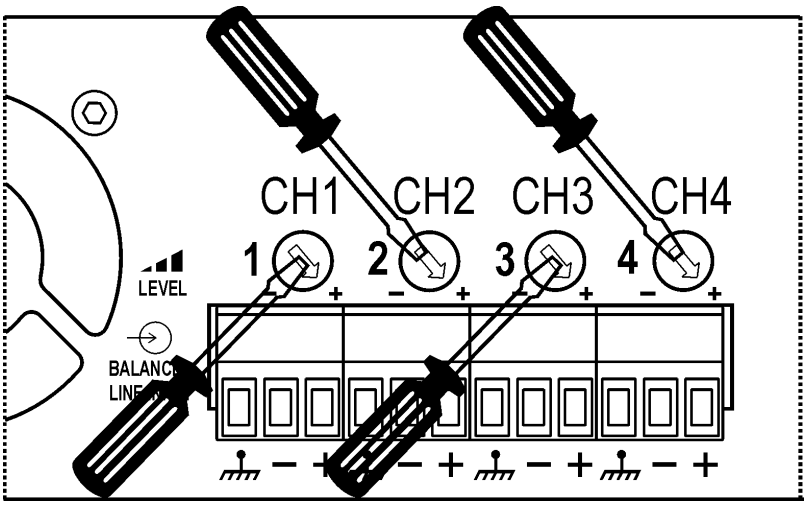
IMPORTANT:

- 20Kohm nominal impedance inputs.
- For unbalanced signals is mandatory to connect together pin 1 and 2.

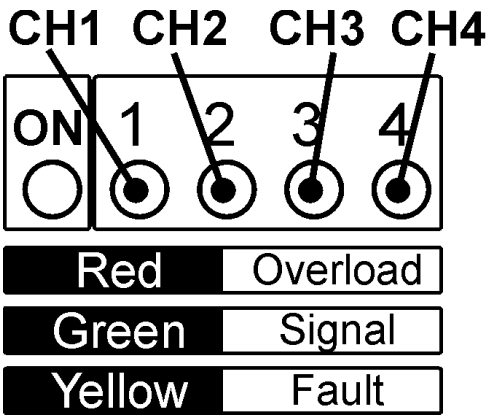
Input connections advices

- Use only hi-quality coaxial cables.
- Unbalanced connections must be as shortest as possible
- Do not put low level signal cables close to high level ones (speakers cables) or close to power cables. This avoid induction noise introduction.
- DO NOT CONNECT together input and output grounds to avoid ground loops.
- Switch off the amplifier before make changes on connections.
- Keep in mind that the system can give instant high power.

4 CHANNEL AMPLIFICATION INPUT LEVEL ADJUSTMENT



Level controls on rear panel are independent for each channel in the section.

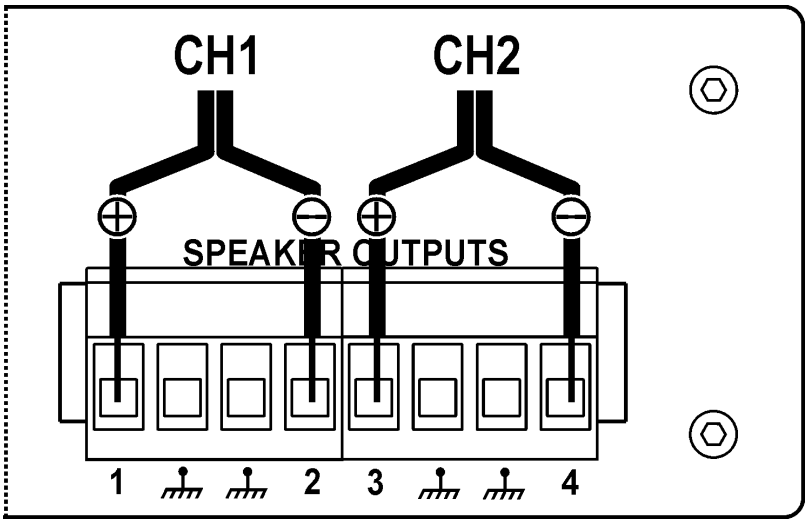


IMPORTANT:
Adjust input sensibility until green LED lights on.
If the LED becomes red, input signal is saturated; this generates audio distortion to the output.

3.2 2 channels amplification - BRIDGED

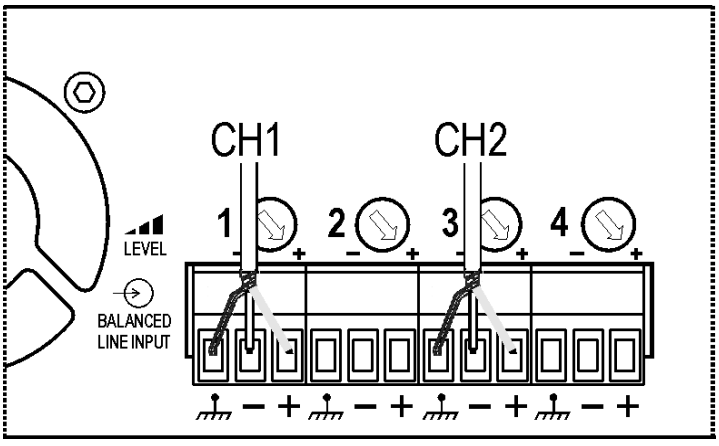
IMPORTANT:
When a section is used in BRIDGED mode (the two channels of the section are bridged), the internal “jumpers” must be set as indicated on page 12.

2 CHANNELS BRIDGED MODE AMPLIFICATION OUTPUT CONNECTION



- In case of BRIDGED mode use, the outputs are ground lifted, also with no signal; do not connect the negative pole to the amplifier chassis.

2 CHANNELS BRIDGED MODE AMPLIFICATION INPUT CONNECTION

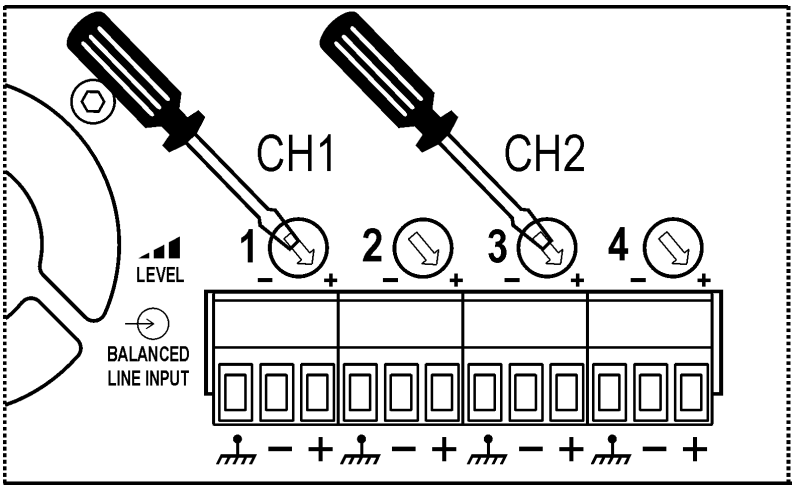


BALANCED INPUT:
Pin 1: ground
Pin 2: reversed phase signal
Pin 3: in phase signal

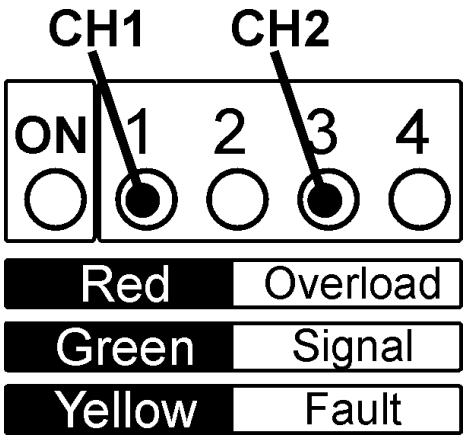
UNBALANCED INPUT:
Pin 1: ground
Pin 2: ground
Pin 3: in phase signal

IMPORTANT:
- 20Kohm nominal impedance inputs.
- For unbalanced signals is mandatory to connect together pin 1 and 2.

2 CHANNELS BRIDGED MODE AMPLIFICATION INPUT LEVELS ADJUSTMENT



Volume adjustment for the section is made by the correspondent input channel potentiometer.



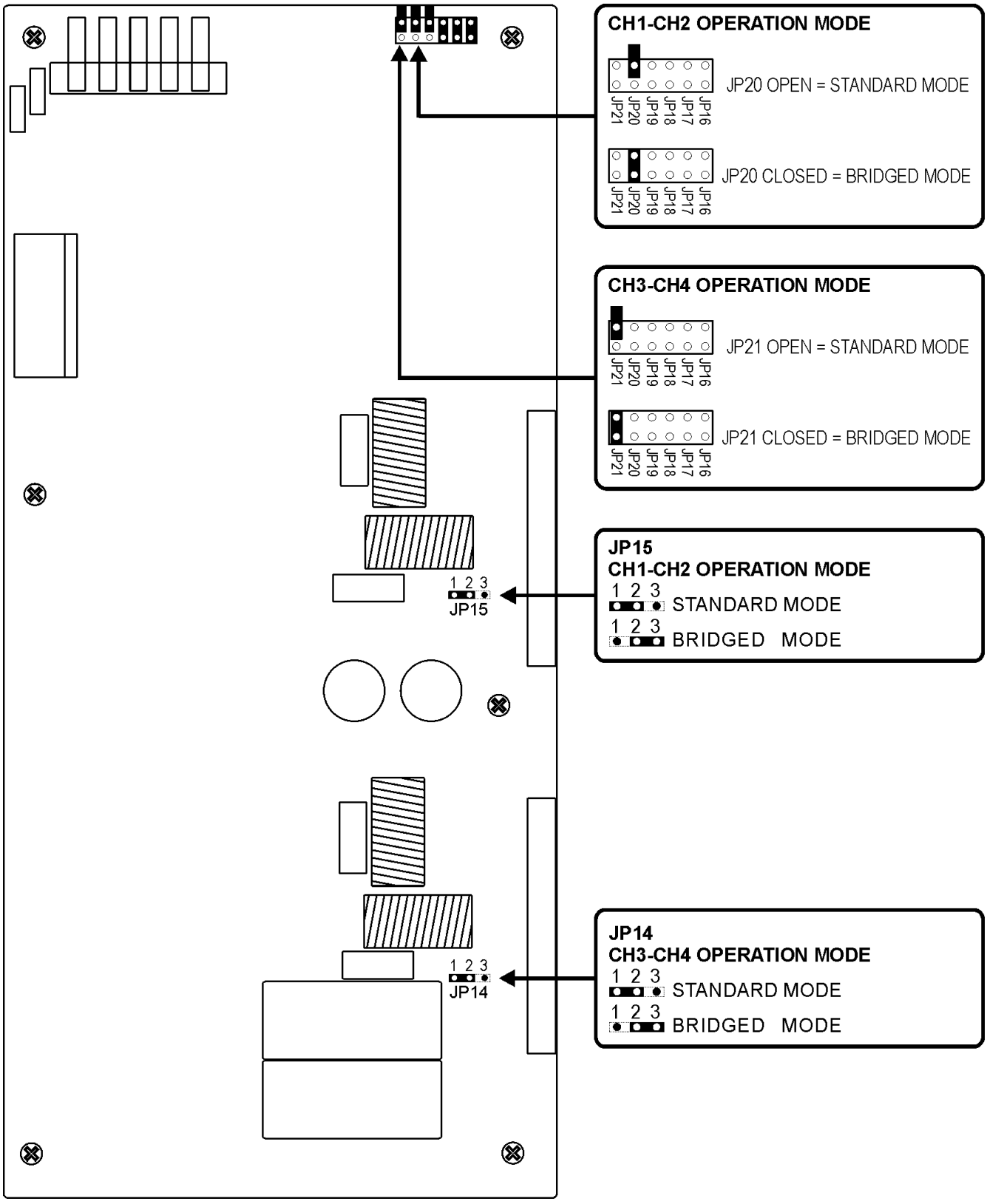
IMPORTANT:
Adjust input sensibility until green LED lights on.
If the LED becomes red, input signal is saturated; this generates audio distortion to the output.

STANDARD - BRIDGED MODE SETTING

DA480-R has 4 independent channels divided into 2 sections CH1-CH2 and CH3-CH4.
Such sections run in separate and independent channels mode, or in "BRIDGED" mode that means that the same section channels are bridged.
Operating mode is set by "jumpers" that are into the amplifier (TWO for each section), that can be reached removing the 4 cover screws.

IMPORTANT:

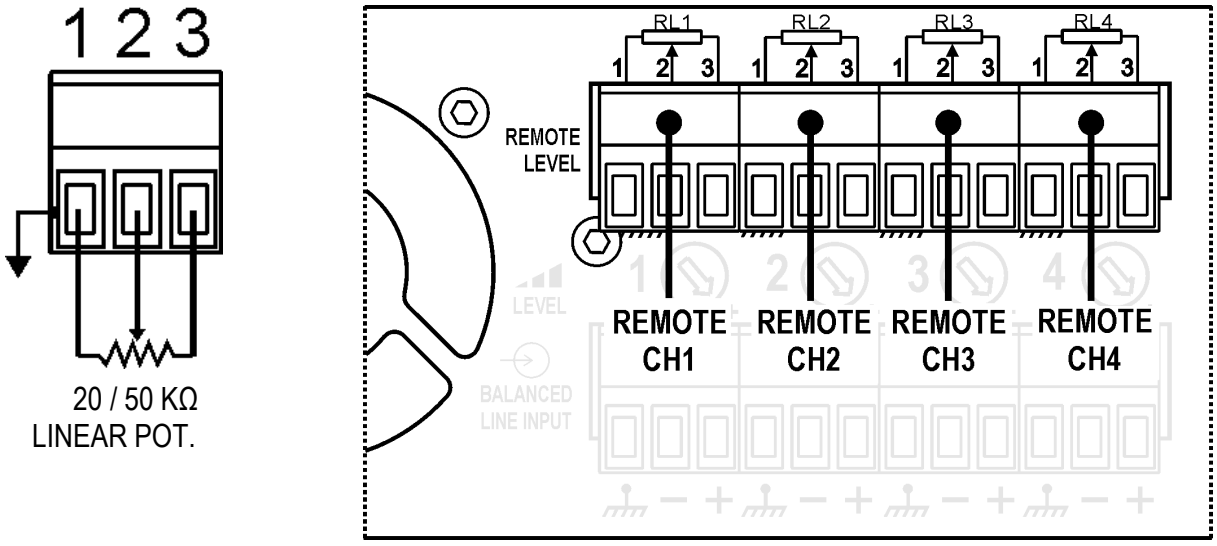
- **In such configuration 8 ohms is the minimum impedance**
- **It's advisable to disconnect mains cable during mode setting operations to avoid damage to the amplifier.**


CH1-CH2 OPERATION MODE
JP21 JP20 JP19 JP18 JP17 JP16
JP20 OPEN = STANDARD MODE
JP20 CLOSED = BRIDGED MODE
CH3-CH4 OPERATION MODE
JP21 OPEN = STANDARD MODE
JP21 CLOSED = BRIDGED MODE
1 2 3
JP15
JP15
CH1-CH2 OPERATION MODE
STANDARD MODE
BRIDGED MODE
1 2 3
JP14
JP14
CH3-CH4 OPERATION MODE
STANDARD MODE
BRIDGED MODE

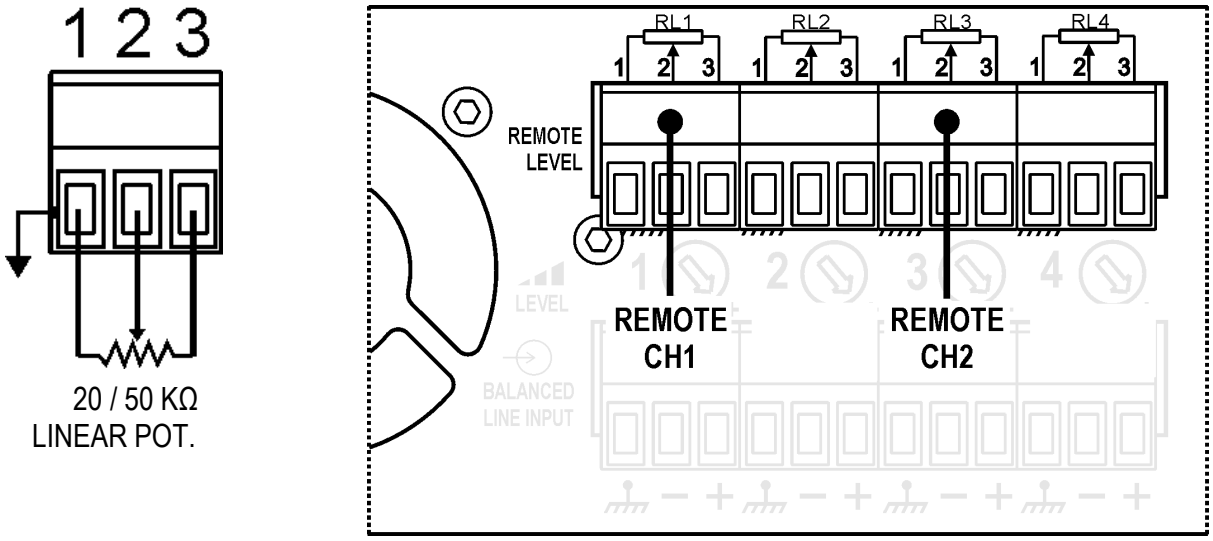
3.3 Volume remote control - VCA

There is one connector for each single channel on the amplifier back, where connect a potentiometer to allow volume remote control.

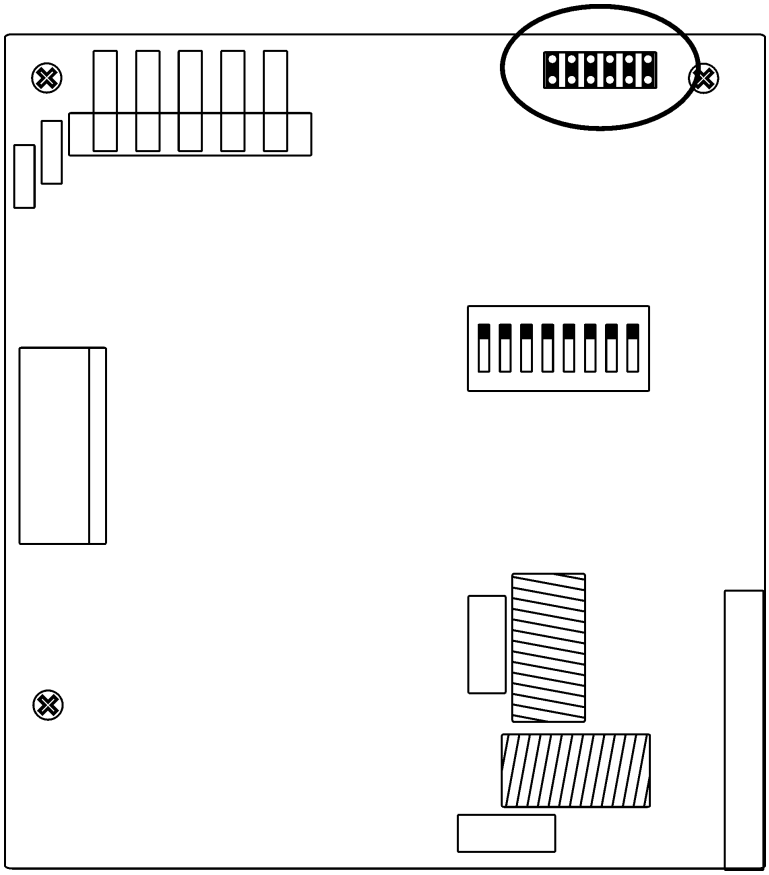
VOLUME REMOTE CONTROL IN 4 CHANNELS AMPLIFICATION

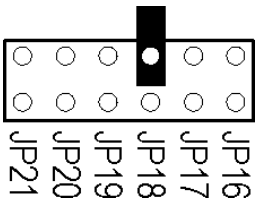
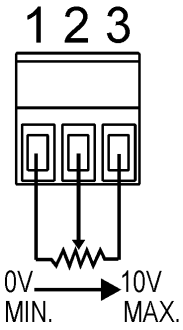
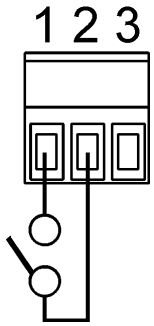
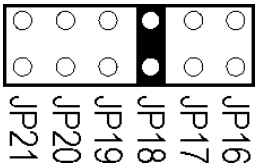
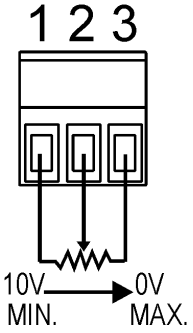
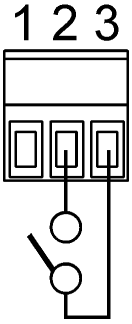


VOLUME REMOTE CONTROL IN 2 CHANNELS BRIDGED MODE AMPLIFICATION



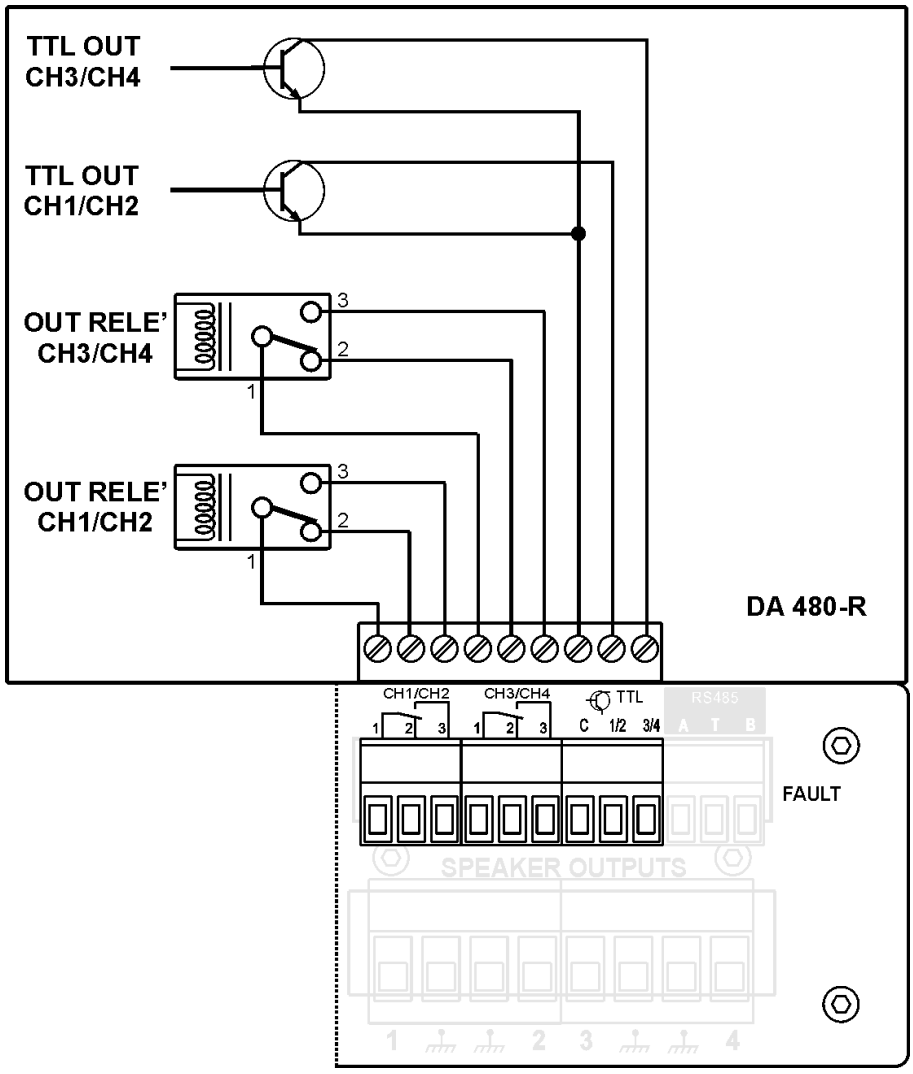
REMOTE CONTROL INTERNAL CONFIGURATION



JUMPER	*VCA*		*MUTE*
		***NORMAL 0-10V***	
		***REVERSE 10-0V*** *(DEFAULT)*	

4 Amplifier configurations

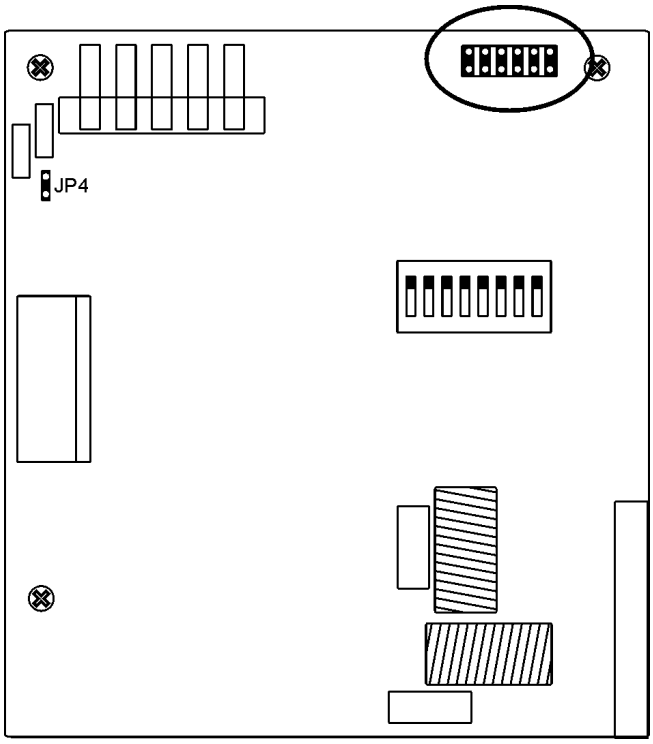
4.1 Fault signal - FAULT

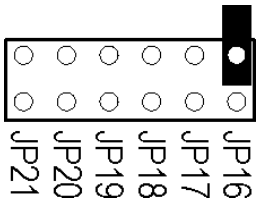
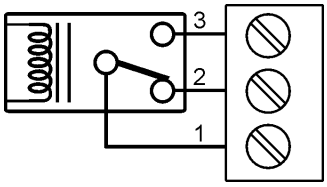
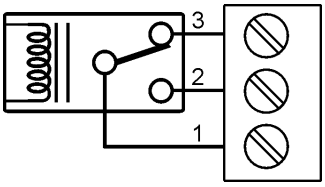
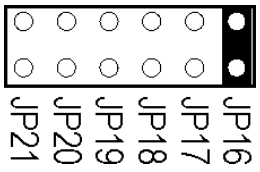
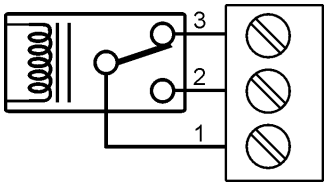
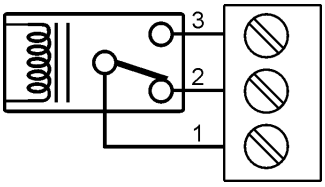
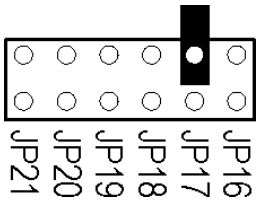
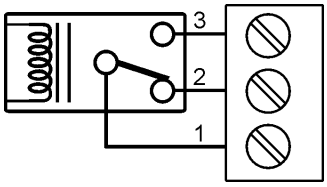
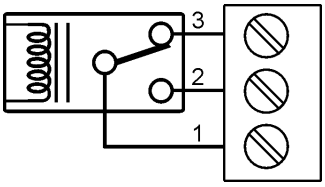
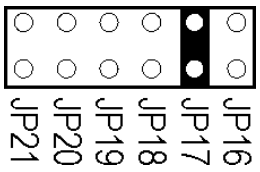
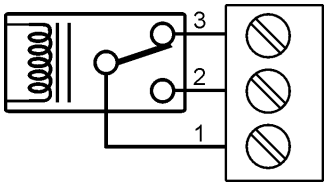
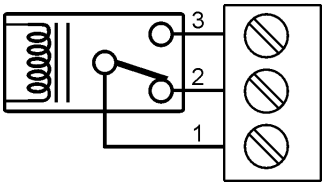


There is a connector on the amplifier back for the amplified channels fault signal, both with relay contact and TTL logic output.
If the amplifier is part of a safety or alarm system, the DA480-R allows setting the relay contacts with reverse logic where contact is normally closed during regular operations and will be open in case of fault.
To enable this operating mode remove the cover and set the jumpers as hereinafter.

IMPORTANT:
This function could be enabled only for the fault signal relay, not for TTL outputs.

FAULT SIGNAL RELAY OUTPUT INTERNAL SETTING



CHANNEL	*JUMPER*	*NORMAL*	*FAULT*
CH1/CH2			
CH1/CH2			
CH3/CH4			
CH3/CH4			

4.2 RS485 Serial communication

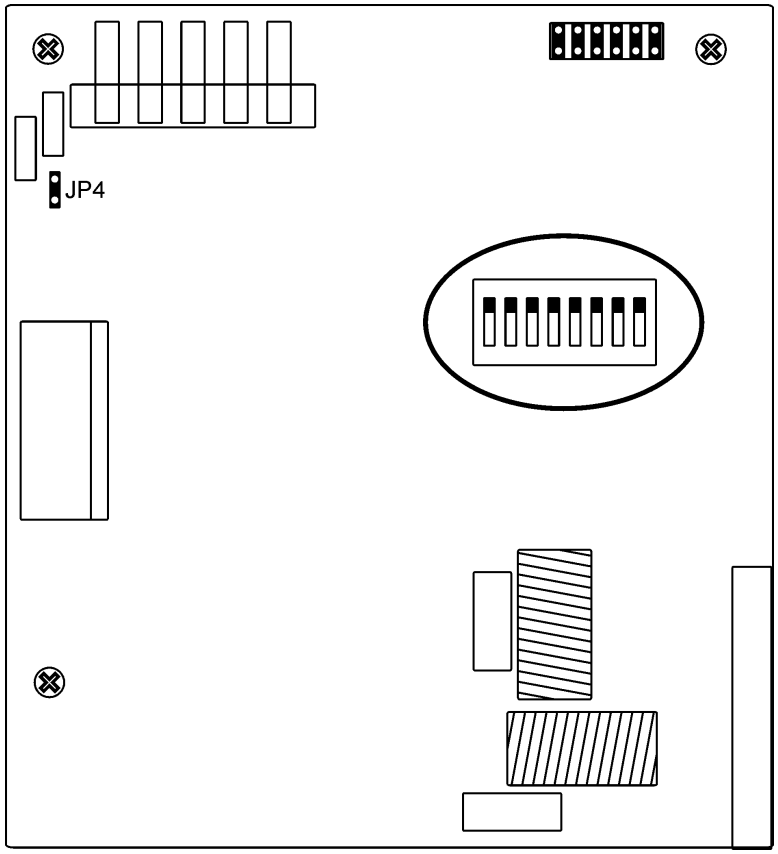
DA 480-R could be connected via serial port to an RS485 communication bus, to be controlled by a master system or a computer.
Because of disturbs on the serial line coming from outside, dysfunctions can occur to the master system with possible harms to the amplifier; to avoid such troubles use the following precautions:

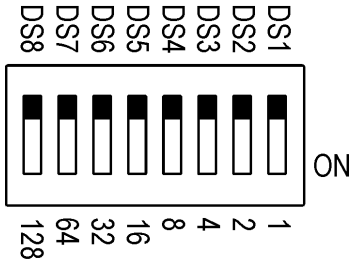
- Do not put serial cables in the same pipe with power cables or hi-voltage cables. Keep a safe distance from those cables, at least 10 cm.
- Connect the cable screen to the ground at one end (not both ends); ground connection should not be made in the same point where hi-voltage circuits are connected to the ground.
- Switch off the whole system before start wiring the serial lines: also missing or parasite currents could damage the modules.

DA 480-R support multipoint serial communication with the RS-485 electric standard, that allows to connect up to 32 amplifiers, each one with its own address.
The address is a number that enables the master system to establish the communication with a specific DA-480 among the several ones connected to the same communication bus.

IMPORTANT: during address setting pay attention to not define more than one module with the same number, otherwise communication becomes confuse and irregular and exchanged data will doesn't make sense.

ADDRESS SETTING ON RS485 BUS

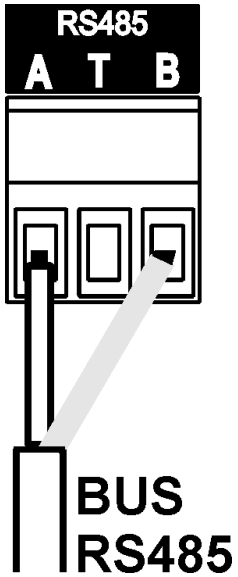


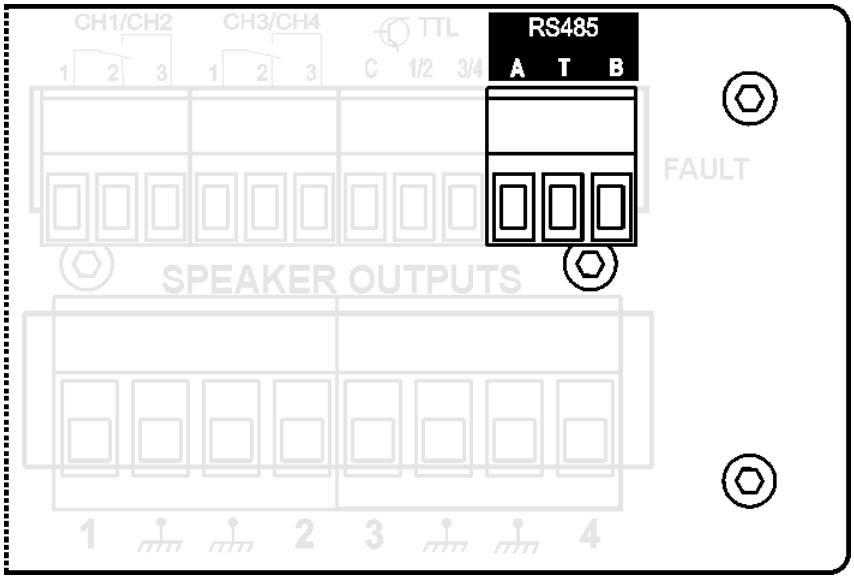


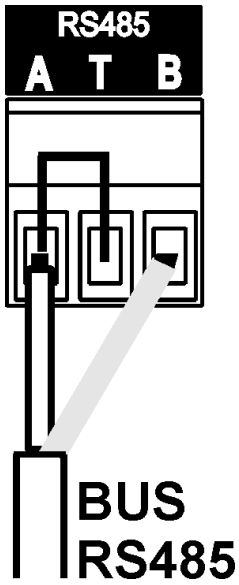
RS485 ADDRESS

DS1 ON= ID + 1
DS2 ON= ID + 2
DS3 ON= ID + 4
DS4 ON= ID + 8
DS5 ON= ID + 16
DS6 ON= ID + 32
DS7 ON= ID + 64
DS8 ON= ID + 128

RS485 BUS CONNECTION







TERMINATION RESISTANCE ON SERIAL LINE

When connected to an RS485 bus should be provided termination resistance at both ends of the line, to avoid stationary waves creation ant to define line impedance also with no transmission.
DA 480-R has the termination resistance inside, but it is disconnected. To plug it in just short circuit A and T clamps as shown in the picture.

4.3 Input sensibility

The amplifier has a circuit inside that allows selecting a different sensibility for the audio signal incoming to accept low output signal sources.
To enable a different sensibility remove the cover and set the jumpers as shown in the following picture.

INPUT SIGNAL SENSIBILITY SETTING

WITHOUT JUMPER = -5,7dBu

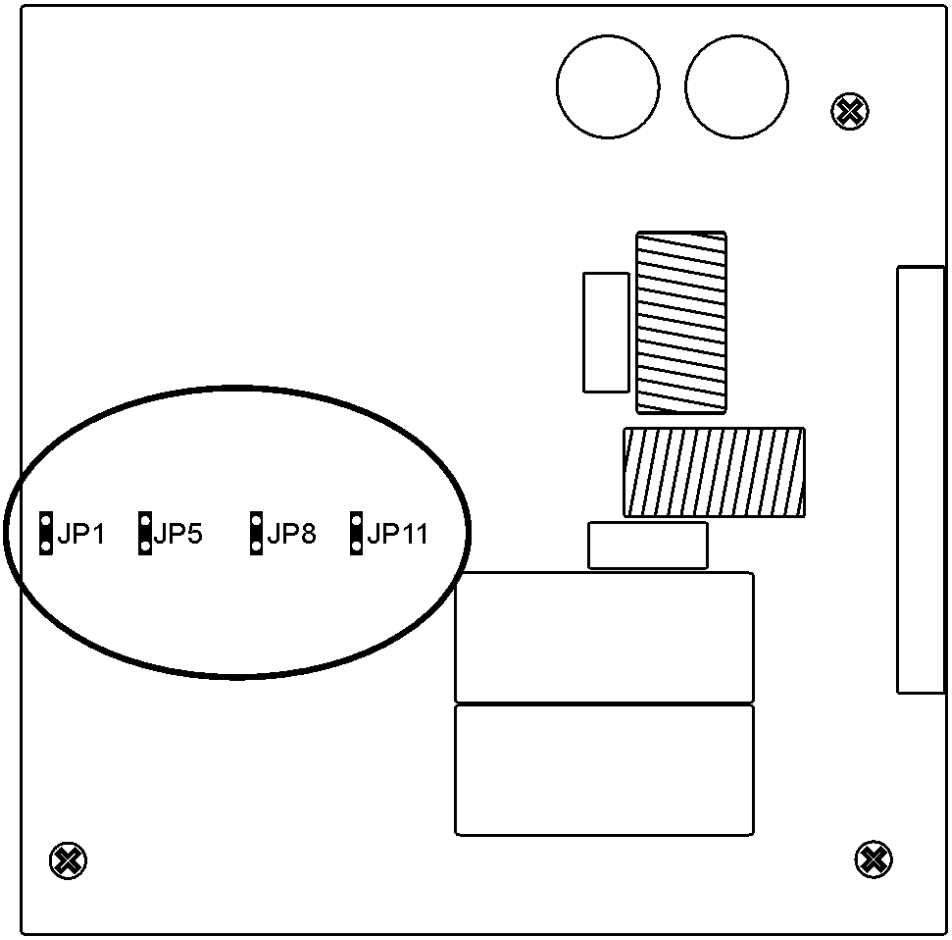
WITH JUMPER =+3,8dBu
(DEFAULT)

CH1 = JP1

CH2 = JP5

CH3 = JP8

CH4 = JP11



4.4 Hi-pass filter

The amplifier has inside an hi-pass filter between the input signal section and the power amplification section, independent for each channel; this allow to directly drive the limited band speakers.
To enable the filter remove the cover and set the jumpers as per the following scheme.

IMPORTANT:

To enable the filter use both jumpers for each channel.

HI-PASS FILTER SETTING

WITHOUT JUMPER = 160Hz

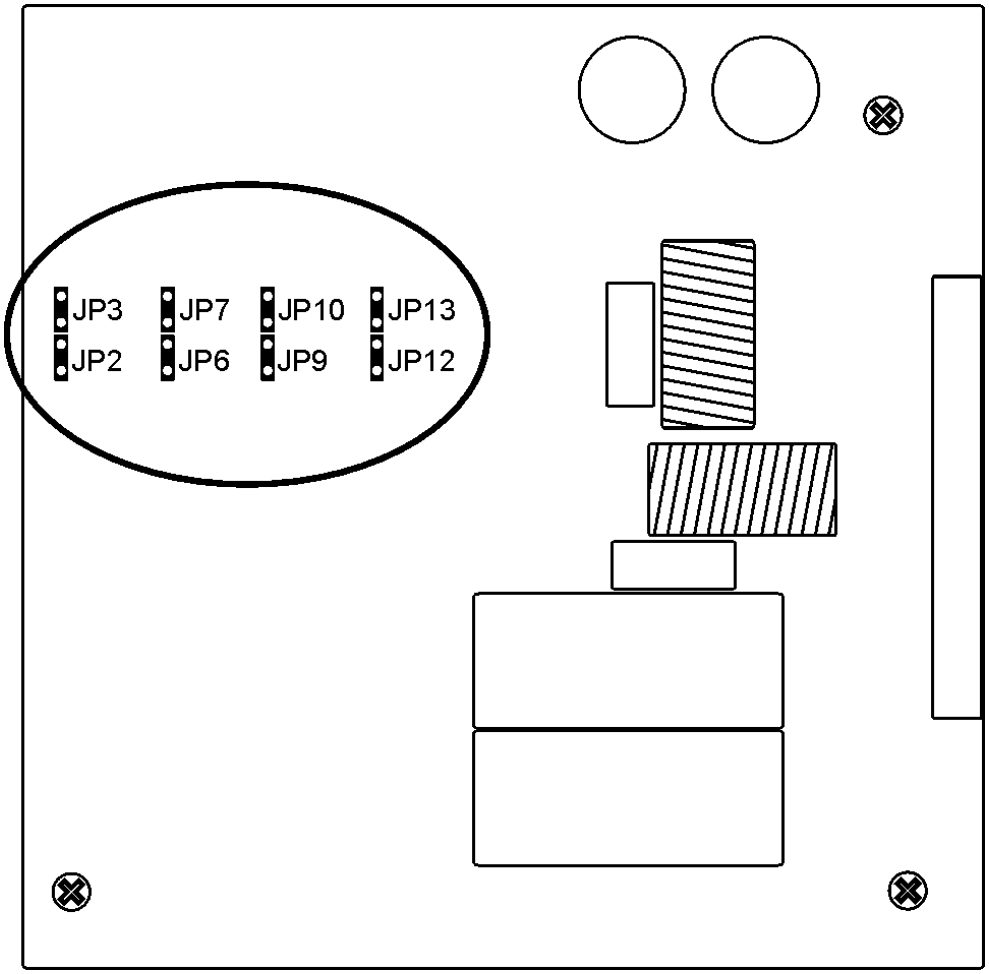
WITH JUMPER = 30Hz
(DEFAULT)

CH1 = JP2 – JP3

CH2 = JP6 – JP7

CH3 = JP9 – JP10

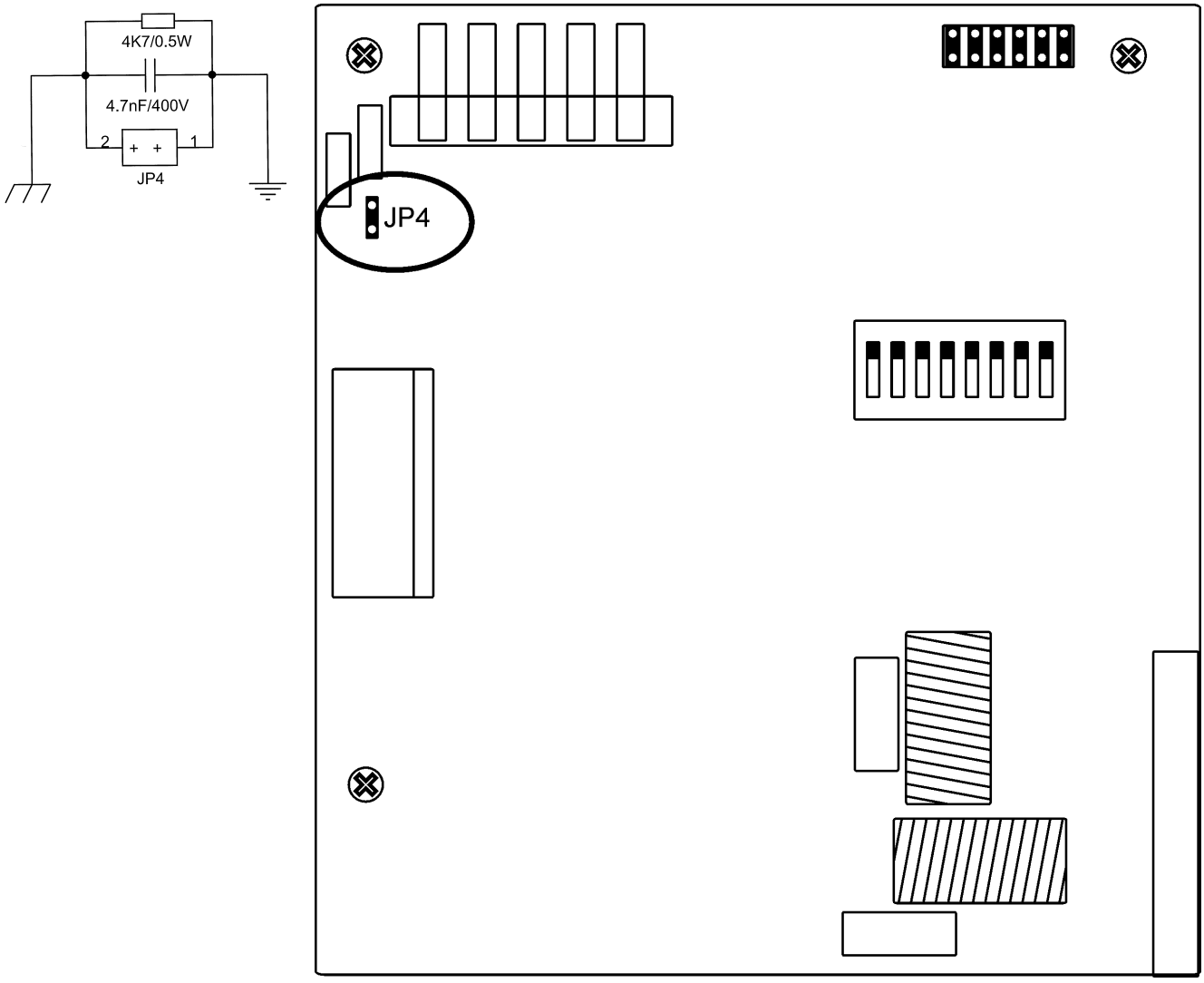
CH4 = JP12 – JP13



4.5 GROUND-LIFT

If there is low frequencies noise on the speakers due to ground loops, it's advisable to set JP4 jumper to OPEN position; that means to split audio ground from chassis ground.

GROUND LIFT CONFIGURATION

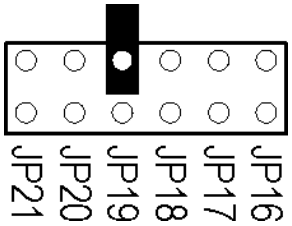


4.6 FACTORY RESET

The amplifier allows to reset all the parameters stored into the internal microchip to the original factory configuration; to enable this function remove the cover and set JP19 jumper carrying out the procedure as following:

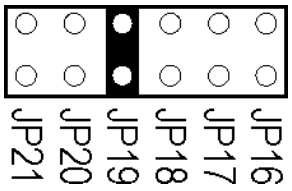
FACTORY RESET

1



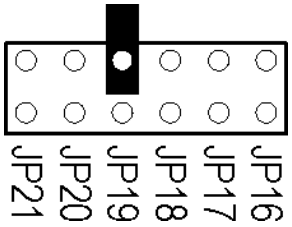
(DEFAULT)

2

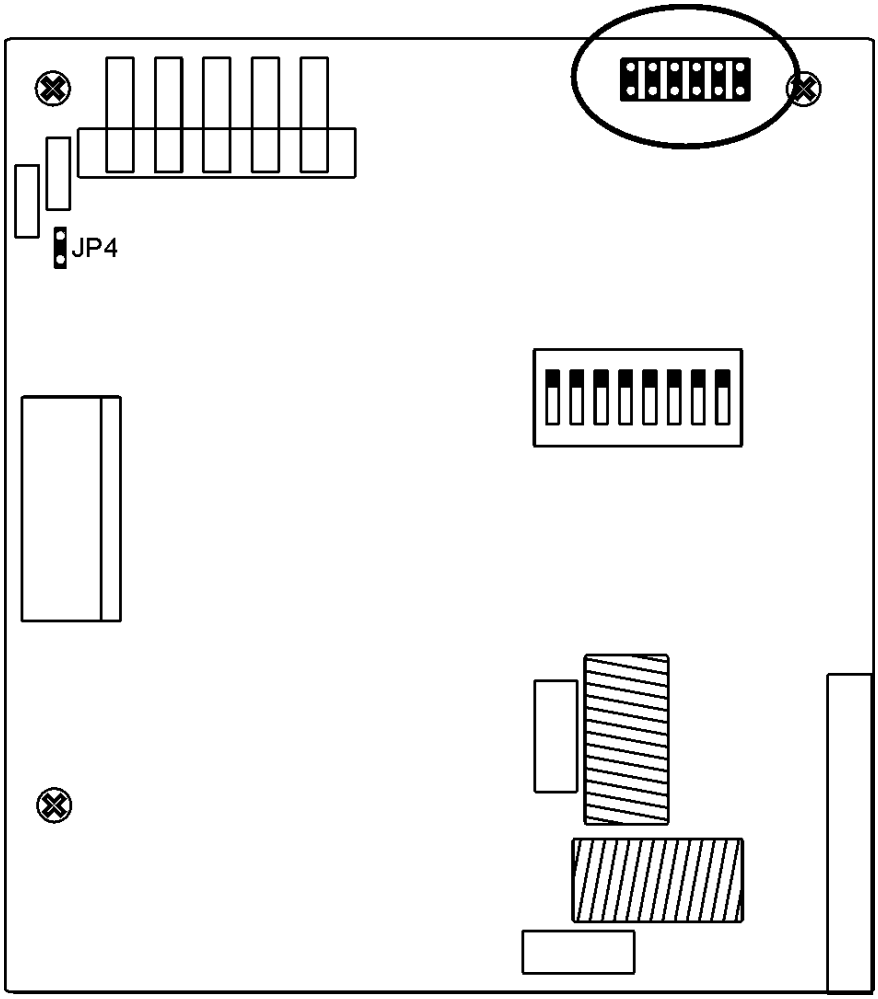


3 **POWER CYCLE**
Switch on the amplifier for 5 seconds with JP19 closed, than switch it off.

4



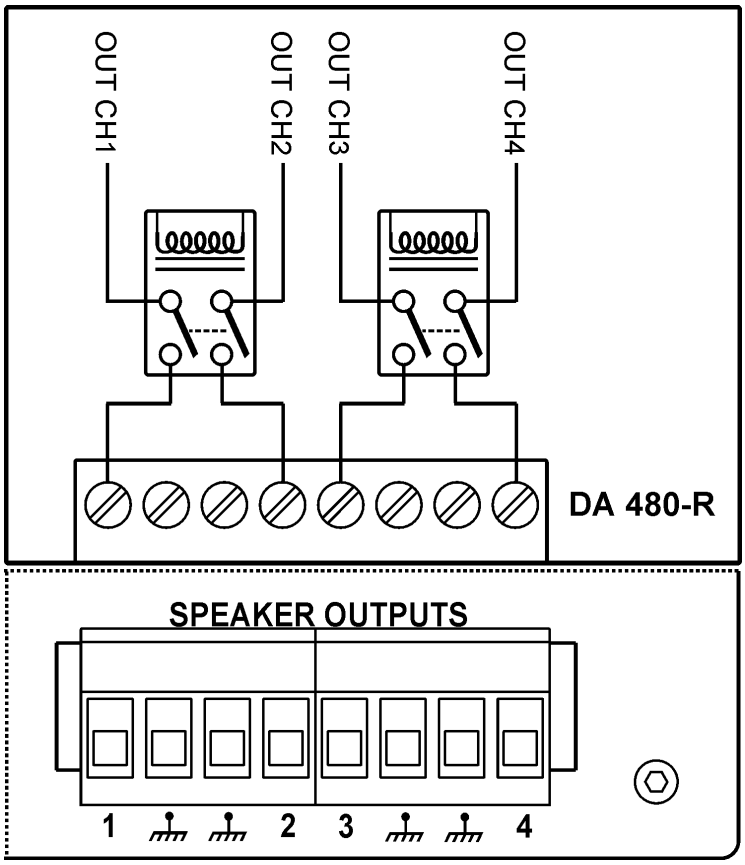
Put JP19 back (open) as in origin.



5 Protections

5.1 Speakers protection

DA 480-R ha an output protection relay that disconnect speakers in case of amplifier fault. During boot the device makes a voltage test, checks the optimal working of the power amplifiers and, only after, speakers connector relay will be enabled.



5.2 Thermal protection

When the amplifier's internal temperature reaches high levels, the cooling fan will be activated with variable speed depending on the temperature.
In case the amplifiers reach the maximum allowed temperature, the thermal protection will be activated and the involved channels will be deactivated, switching them back on when an acceptable running temperature is reached. This condition is indicated with a FAULT LED.

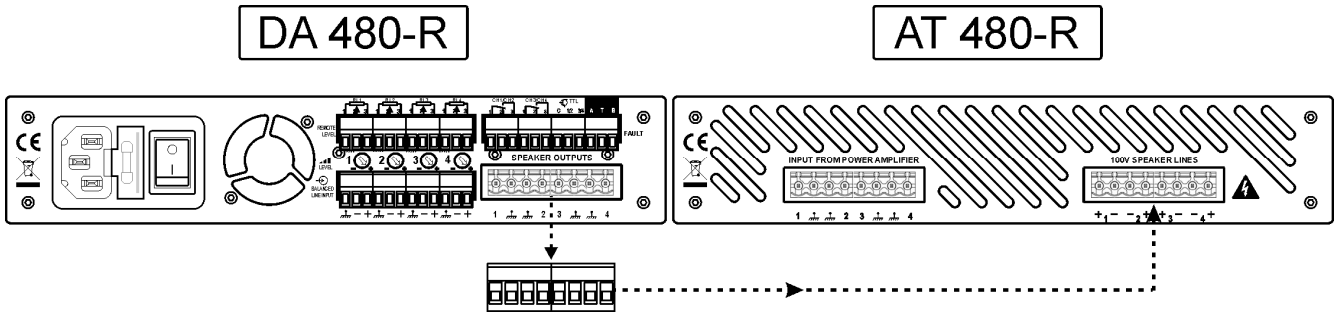
5.3 Over-current and short-circuit protection

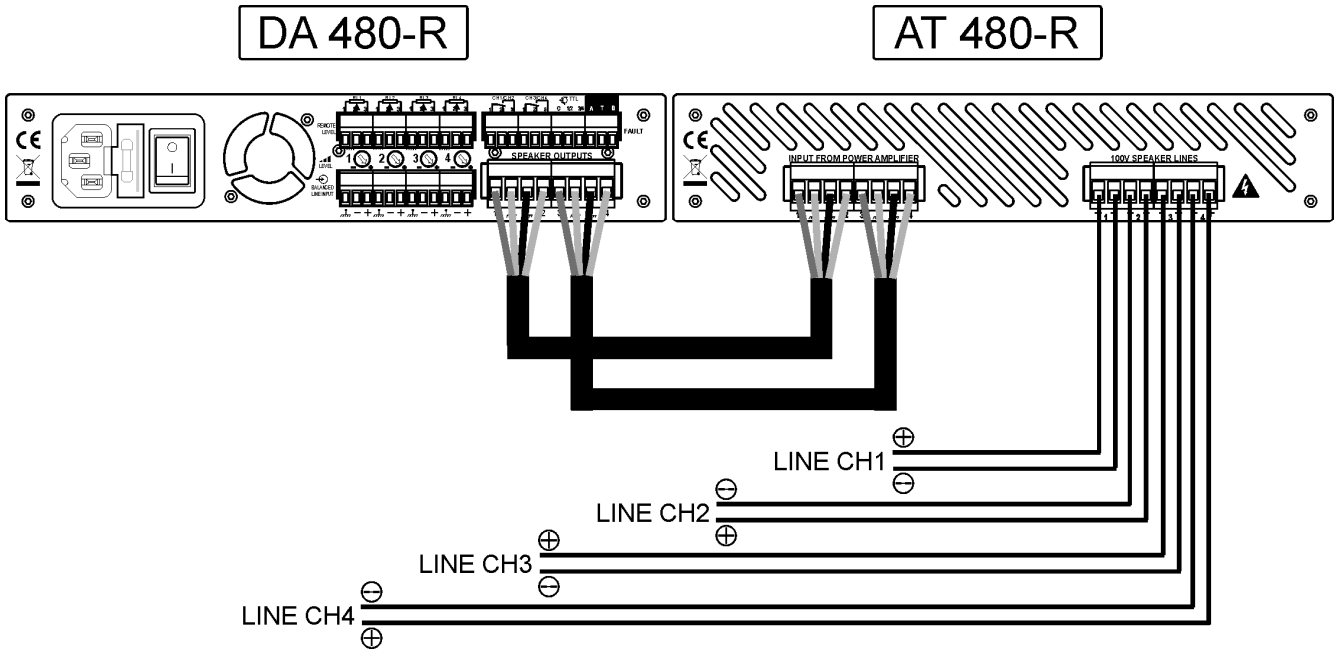
The device has inside an "high-currents" or "output short-circuit present" protection circuit, in those cases the involved channels will be switched off with FAULT LED indication.

6 Constant voltage outputs (100V)

6. 1 Connection to the AT 480-R

For applications with constant voltage outputs, DA 480-R can be connected to the AT480-R, a multi-channel audio transformer that assure a high passing band, low distortion and complete galvanic insulation between audio source and the 100V speaker lines.
To connect the AT 480R to the DA 480-R, use the cables, included in the package, as following:





IMPORTANT:

For applications with constant voltage outputs we suggest to enable the amplifier's internal hi-pass filter for each channel, this allow to directly drive limited band loudspeakers.
To enable the filter lift the cover and set the "jumpers" as in the picture here below.

AT 480-R HI-PASS FILTER SETTINGS

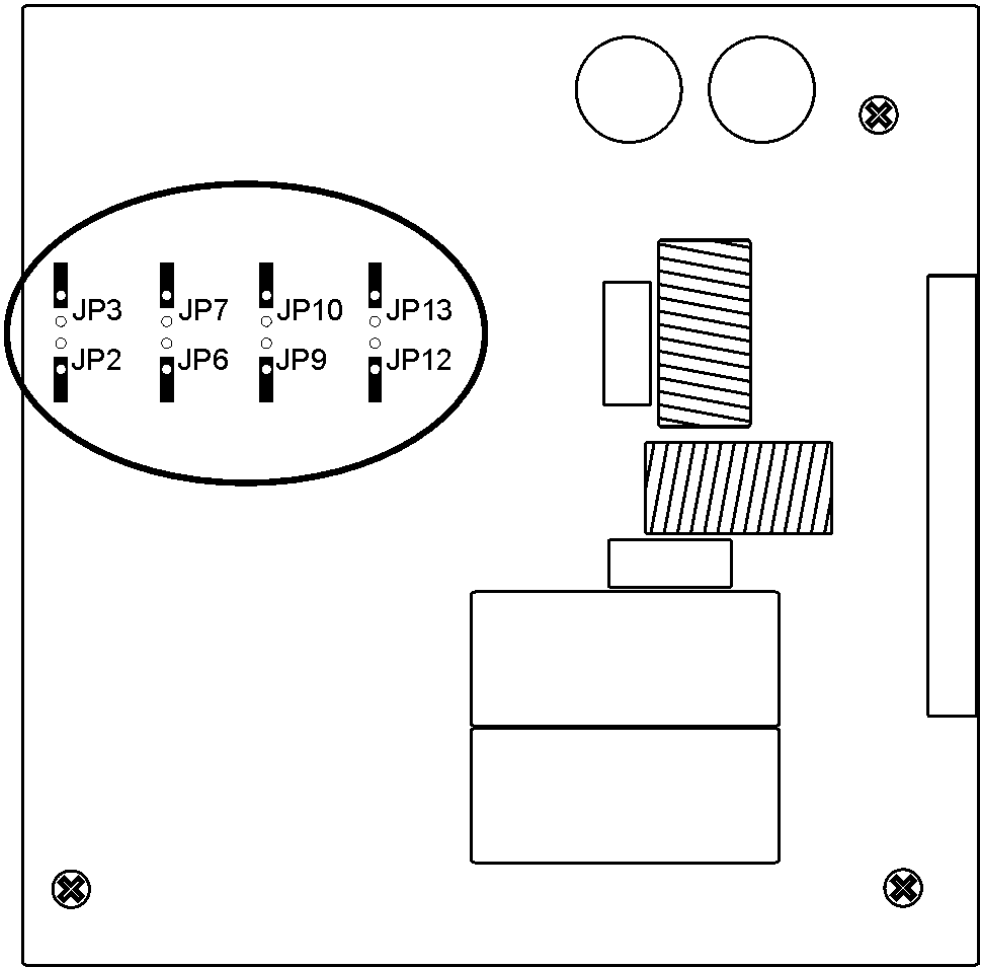
WITHOUT JUMPER = 160Hz

CH1 = JP2 – JP3

CH2 = JP6 – JP7

CH3 = JP9 – JP10

CH4 = JP12 – JP13



7 Specifications

7.1 Technical features

Mains power……..…. : 230 Vac 50/60 Hz
Consumption (during standby)….. : 1 W
Mains protection……..…. : 3,15A retard fuse.
Output power per channel…….. : 80W (4 Ω) 1 kHz THD+N= 0,1%
Output power in BRIDGED mode.. : 160W (8 Ω) 1 kHz THD+N= 0,1%
Frequency response……..…..: 20 ~ 20.000 Hz (±3dB)
Signal to noise ratio……..... : 102dB.
Harmonic distortion…….…….. : < 0,1%
Productivity…… : 90% (4 Ω)
Input impedance……..…. : 20kohms
Input sensibility……..... : +3,8dbu (1,2v) e –5,7dbu (400mV)
Protections……..…… - Overload
- Short circuit to ground
- Under-voltage and over-voltage
- DC
- Subsonic signals

Cooling……..……. : variable speed fan with temperature check
Classification……..…….. : IP 30 in the strength of liquid and powders permeation.
Dimensions / Weight…….…… : 215x211x44mm. / 1,8Kg.

CEE directive compliant:

Safety…….….....…….. : 2006/95/EC
Electromagnetic compatibility..... : 2004/108/EC

Applied standards:

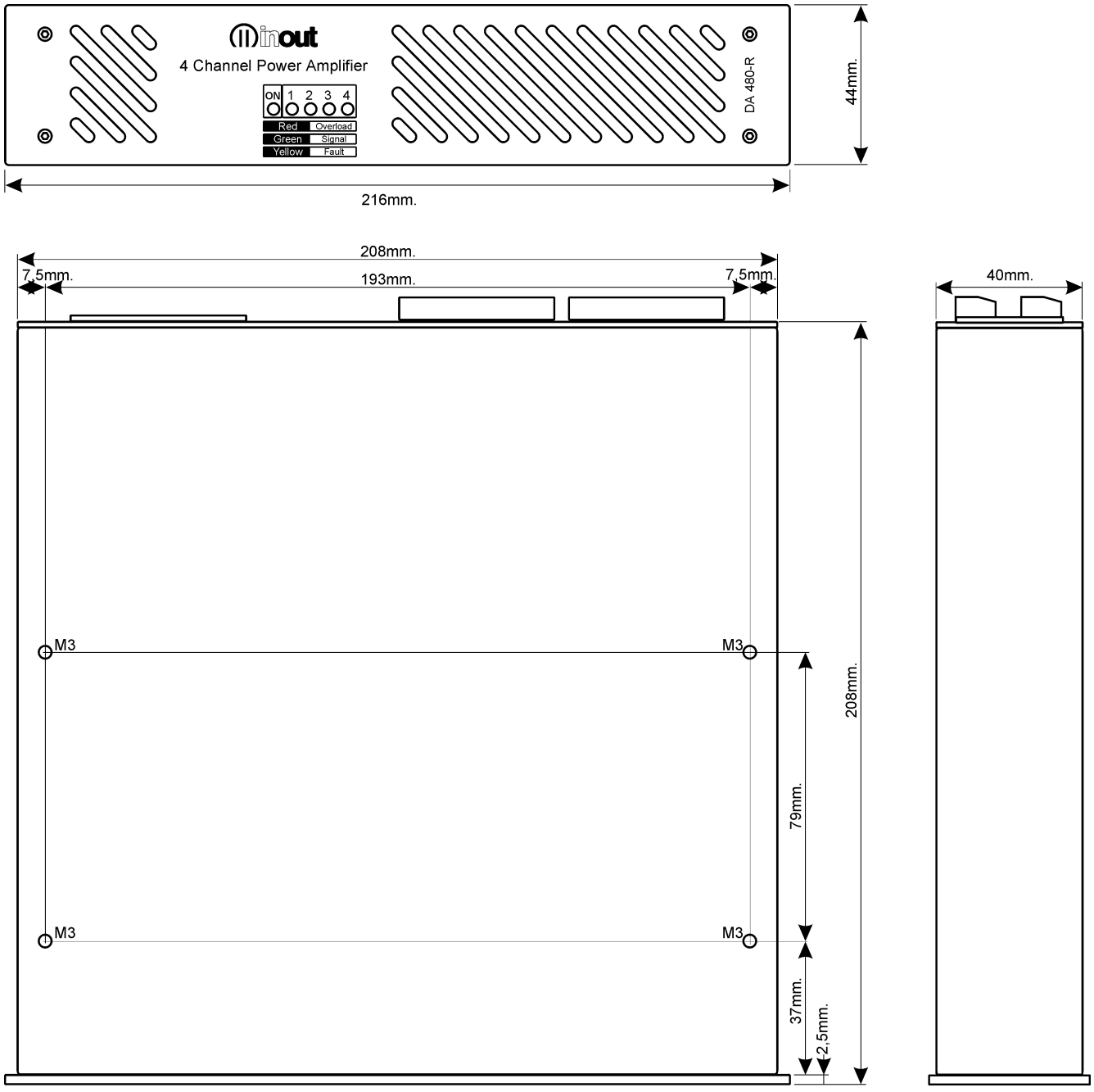
Safety.....: EN 60065: 2002 + A1:2006
Audio, video and similar electronic apparatus – Safety requirements.

Electromagnetic compatibility..... : EN 55103-1: 1998 Environment E2
Product family standard or audio, video, audio-visual and entertainment lighting control apparatus for professional use.
Part 1: Emission

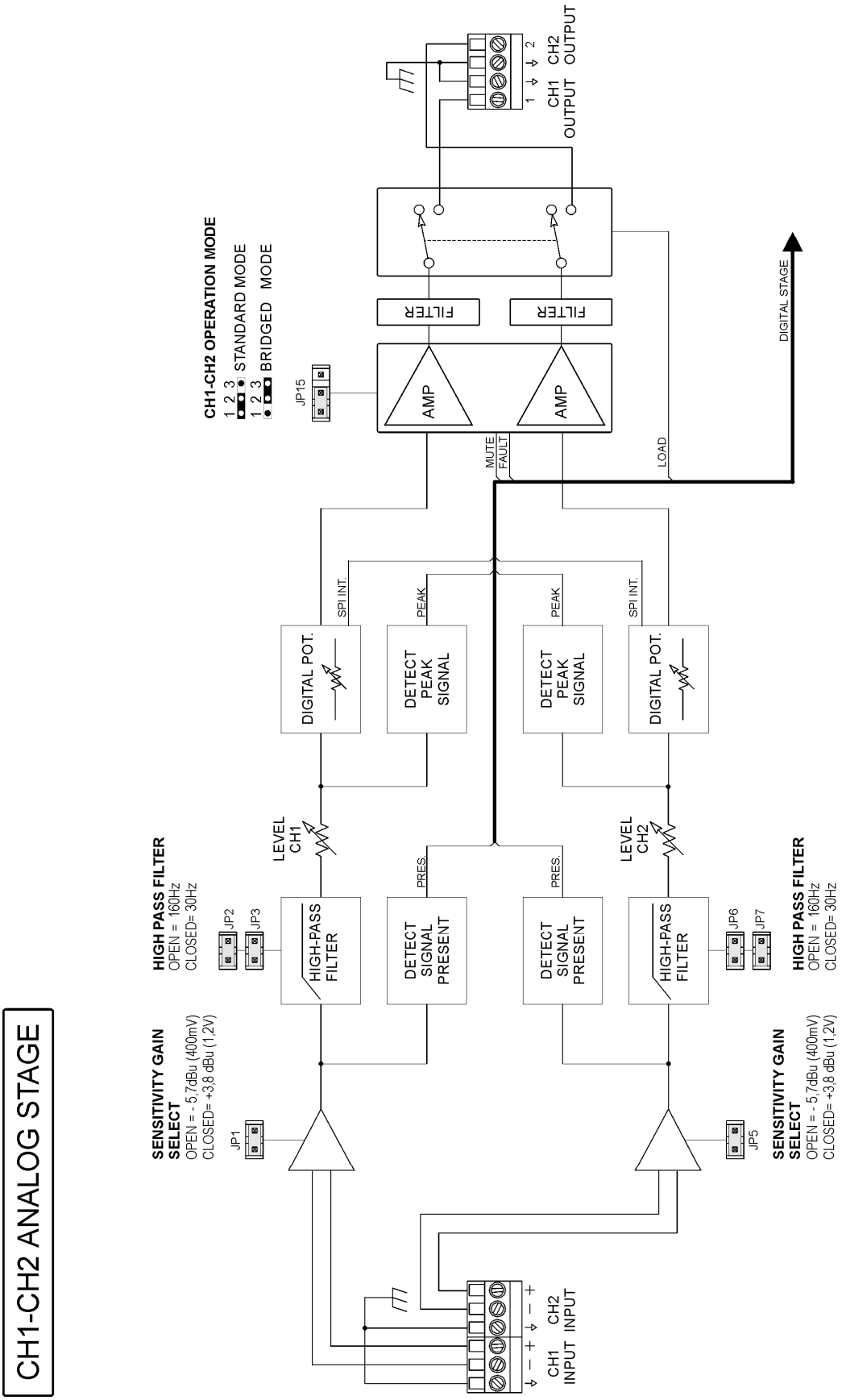
: EN 55103-2: 1998 Environment E2
Product family standard or audio, video, audio-visual and entertainment lighting control apparatus for professional use.
Part 2: Immunity

CE Manufactured by: inout Noventa di Piave (VE) - ITALY

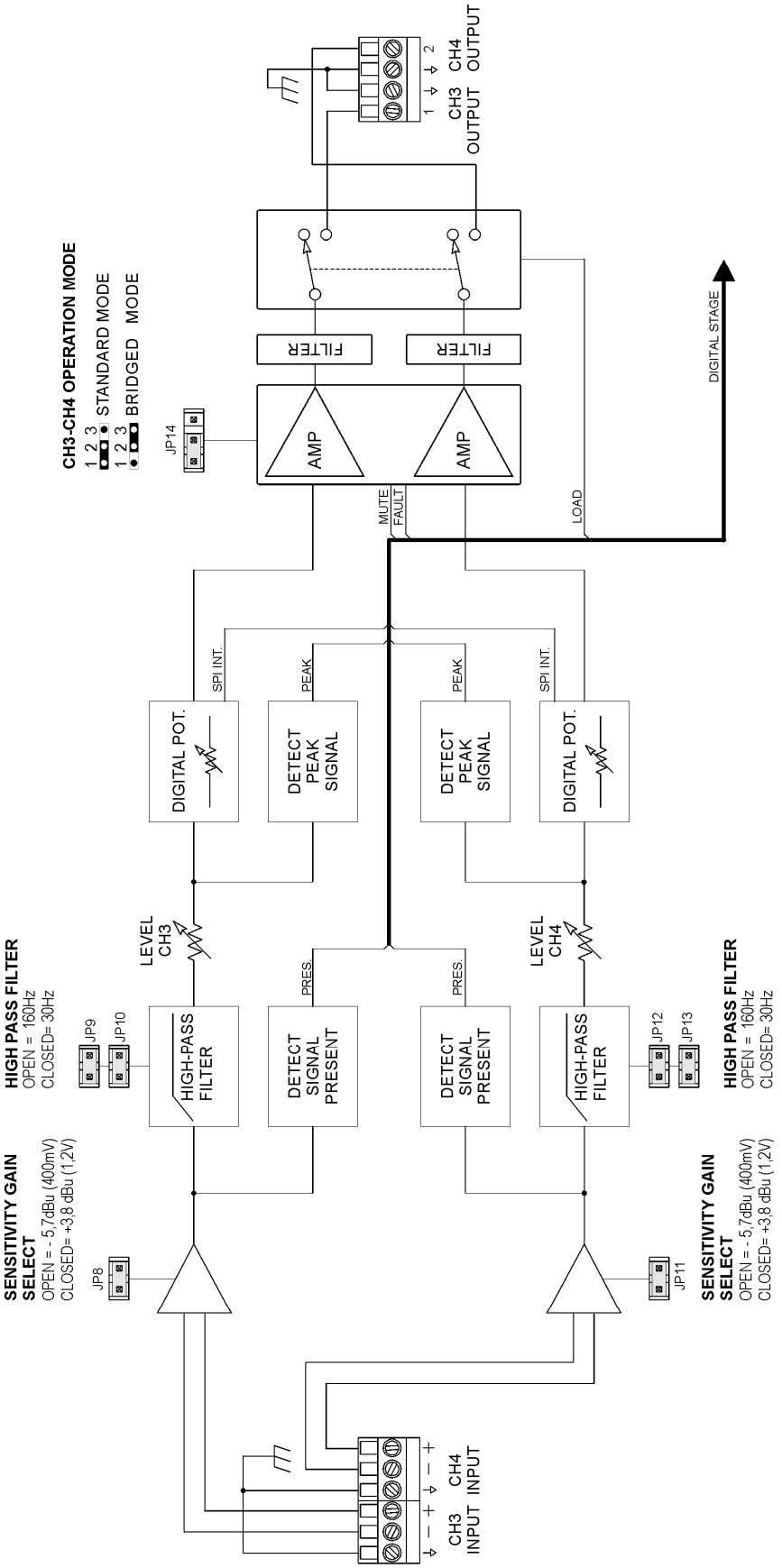
7.2 Mechanical dimensions

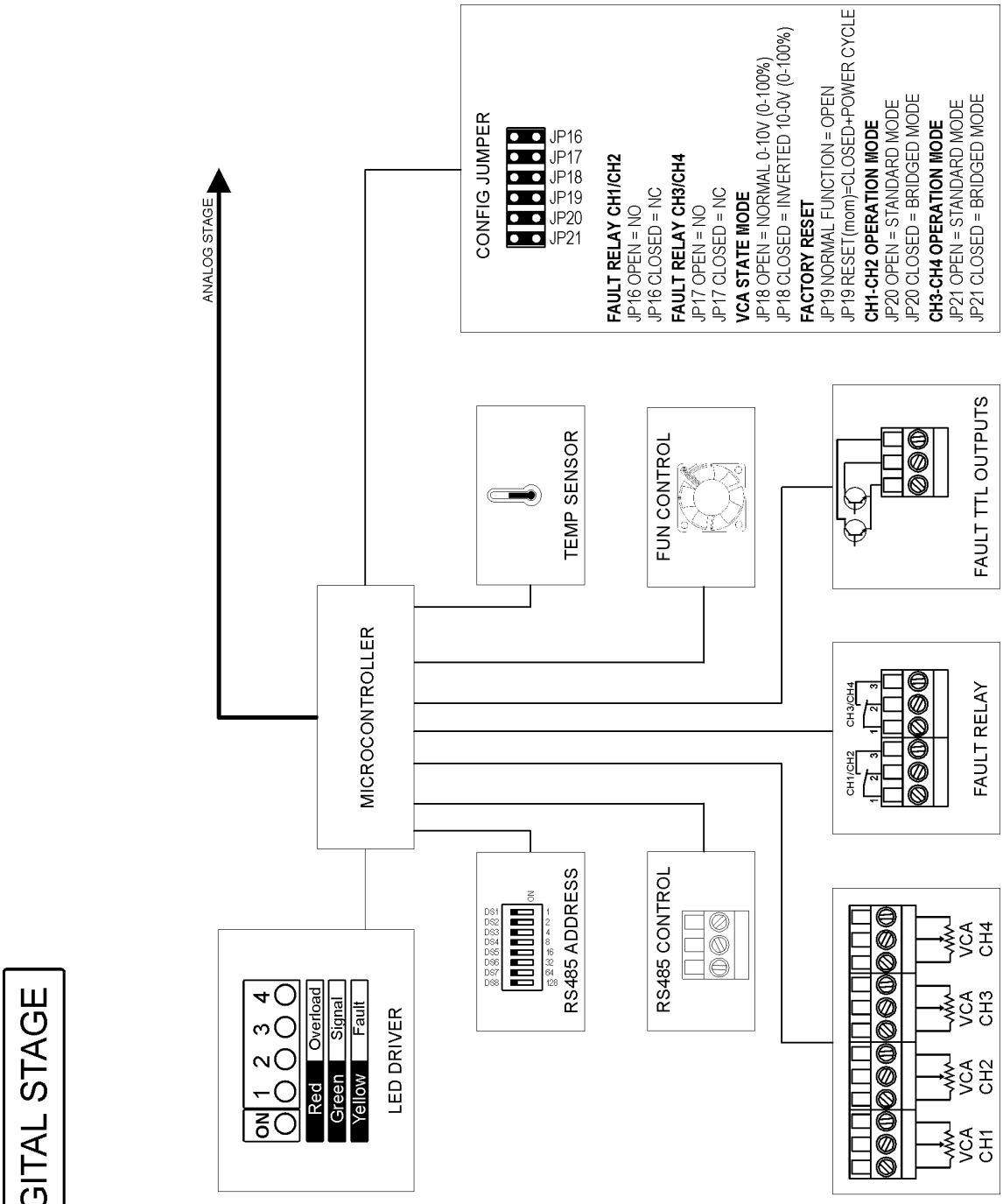


7.3 Block diagram



CH3-CH4 ANALOG STAGE




4 CHANNEL DIGITAL STAGE
ANALOG STAGE
MICROCONTROLLER
LED DRIVER
ON 1 2 3 4
Red Overload
Green Signal
Yellow Fault
RS485 ADDRESS
RS485 CONTROL
TEMP SENSOR
FUN CONTROL
FAULT TTL OUTPUTS
FAULT RELAY
CH1/CH2
CH3/CH4
VCA CH1
VCA CH2
VCA CH3
VCA CH4
CONFIG JUMPER
JP16
JP17
JP18
JP19
JP20
JP21
FAULT RELAY CH1/CH2
JP16 OPEN = NO
JP16 CLOSED = NC
FAULT RELAY CH3/CH4
JP17 OPEN = NO
JP17 CLOSED = NC
VCA STATE MODE
JP18 OPEN = NORMAL 0-10V (0-100%)
JP18 CLOSED = INVERTED 10-0V (0-100%)
FACTORY RESET
JP19 NORMAL FUNCTION = OPEN
JP19 RESET(mom)=CLOSED+POWER CYCLE
CH1-CH2 OPERATION MODE
JP20 OPEN = STANDARD MODE
JP20 CLOSED = BRIDGED MODE
CH3-CH4 OPERATION MODE
JP21 OPEN = STANDARD MODE
JP21 CLOSED = BRIDGED MODE